ascertaining the source of clinical specimens in cases of mix-up; and, perhaps eventually, with an expanded range of minisatellite probes or appropriately synthesized oligonucleotide probes, examining genetic predispositions for diseases for which suitable markers are lacking.

With dramatic success already shown, there is a growing commercial interest in the test, and, in fact, the Imperial Chemical Industry has opened in the United Kingdom its first laboratory for DNA fingerprinting.

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Lymphocyte Gene Rearrangement Studies in Formalin-Fixed, Paraffin-Embedded Pathology Specimens

THE USE OF RECOMBINANT DNA TECHNOLOGIES to detect clonal rearrangements of immunoglobulin or T-cell receptor genes is becoming an increasingly valuable adjunct to more conventional methods in the diagnosis and assessment of B- or T-cell lymphoproliferative disorders. Until recently this technique depended on the availability of fresh or frozen tissue specimens, limiting its applicability in clinical medicine. We have therefore examined the feasibility of using our previously reported procedure for extracting DNA from formalin-fixed pathology specimens for gene rearrangement studies in such specimens.

We were able to show clonal rearrangement of heavy and light chain immunoglobulin genes in about 75% of blocks of formalin-fixed, paraffin-embedded B-cell lymphoma specimens retrieved from the pathology archives at our institution. The success rate at recovering intact high-molecular-weight DNA varied substantially depending on the hospital center from which the paraffin blocks were obtained. The most common reason for failing to recover high-molecular-weight DNA was the use of suboptimally fixed tissue containing partially autolysed areas. Overfixed material was also unsuitable because the amount of intact DNA recovered decreased with the increasing time of exposure to fixative. Tissues immersed in mercuric chloride-containing fixatives such as Zenker's or B5 were not suitable for gene rearrangement studies.

The best results will, therefore, be obtained with tissues sectioned and fixed in buffered formalin immediately after the surgical procedure and preferably for a period of no longer than 24 hours before being embedded in paraffin. Tissues fixed for as long as five days may still be usable, but the quantities of material recovered would be much smaller. Despite its limitations, this technique increases considerably the number of specimens amenable for gene rearrangement studies and should make this approach more applicable to the clinical evaluation of lymphoproliferative disorders.

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Neuropathology of AIDS Dementia

THE AIDS DEMENTIA COMPLEX (ADC) was recognized two to three years ago as a syndrome of progressive neurologic dysfunction that occurs in a substantial proportion of patients with the acquired immunodeficiency syndrome (AIDS). Patients with AIDS may have neurologic abnormalities as a result of one or more of several types of neuropathologic disorders, including opportunistic infections caused by viruses—such as cytomegalovirus, papovavirus, Herpes simplex and zoster viruses—*Toxoplasma gondii,* and fungi such as *Cryptococcus neoformans,* lymphoproliferative disorders including lymphoma and lymphomatoid granulomatosis, and vascular or anoxic-ischemic lesions. Peripheral neuropathy is also frequently found. Early in the AIDS epidemic, however, it became clear that cerebral dysfunction developed in some patients in the absence of any of these specific causal factors. Instead, postmortem examination of the patients' brains revealed poorly defined inflammatory lesions including scattered microglial nodules and perivascular lymphocytes, and myelin loss with intense astrogliosis within white matter of the centrum semiovale of the cerebral hemispheres. Furthermore, Southern blotting methods, in situ hybridization, immunocytochemistry, and electron microscopy showed the presence of the human immunodeficiency virus (HIV) in the brains of many of these patients. A small but definite subset of patients seropositive for HIV appeared to have "pure" brain involvement by this disease without peripheral or systemic manifestations of the syndrome, apparently reflecting neurotropism of HIV in these patients.

Though the ADC is now a recognized and reasonably defined clinicopathologic disorder, its nosology is by no means clear. Patients with the ADC often appear demented out of proportion to the amount of structural damage in the nervous system, although the observed dementia corresponds to the subcortical type expected in patients with primarily white matter brain damage. Conversely, evidence of HIV infection of brain is seen in neurologically normal patients. Although HIV forms with tropism for the nervous system have emerged, the cell type in the brain most commonly infected by HIV is one with macrophage or microglial markers. Infection of astrocytes has been recorded in a few cases, and there is little evidence for infection of neurons or oligodendrocytes. One hypothesis is that HIV-infected macrophages release a product or toxin that damages adjacent white matter.

The pathologic diagnosis of ADC due to HIV infection of brain is based on fairly subtle criteria. White matter injury may be inconspicuous unless large myelin-stained sections are carefully examined. Astrogliosis is best determined using an immunocytochemical procedure for glial fibrillary acidic protein. Finally, perivascular multinucleated cells—including giant cells—with foamy or granular cytoplasm are generally accepted as a marker for HIV within the nervous system. Commercially available antibodies and probes for HIV can also be used for immunocytochemistry or in situ hybridization. The diagnosis can even be made on brain biopsy, but this must be done with great caution because similar, though not identical, white matter changes without the